REMARKS

Applicant respectfully requests reconsideration of the application in view of the amendments and the following arguments.

SUMMARY OF FINAL OFFICE ACTION

Claims 1-13 are pending.

Claims 7-9 were objected to.

Claims 1-3 and 5 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,226,331 of Gambuzza ("Gambuzza").

Claims 6, 10 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,295,343 of Hjartarson ("Hjartarson").

Claim 4 is rejected as being unpatentable under 35 U.S.C. § 103 over Gambuzza.

Claims 11-13 are rejected as being unpatentable over Hjartarson in view of Gambuzza.

Claims 7-9 were indicated as being allowable if rewritten in independent form.

SUMMARY OF AMENDMENTS

Claims 1 and 6 were amended. Support for the amendment to claims 1 and 6 is found, for example, in Figure 6 and at pages 14-16 of the specification as originally filed.

RESPONSE TO 35 U.S.C. § 112 REJECTIONS

The Examiner has objected to the use of the functions HYB0(s) and HYBP(s) in claims 7-9. In particular, the Examiner has indicated that the parameters "s", "HYB0", and "HYBP" should be clearly defined. Claims 7-9 were otherwise indicated as being allowable if re-written in independent form.

Claims 7-9 define various transfer functions. Applicant submits that the use of mathematical statements to describe transfer characteristics (e.g., the relationship between one or more inputs and one or more outputs) is well

known. Applicant notes that Figure 5 and pages 13, line 8 - page 14, line 17 of the specification address hybrid transfer functions.

Applicant submits that it is common practice to define transfer characteristics as ratios of polynomial expressions using the Laplace variable "s" rather than working directly with differential equations in the time domain. For the Examiner's benefit, applicant has provided an article in the accompanying Information Disclosure Statement that describes the Laplace Transform (see, Eric W. Weisstein. "Laplace Transform." From *Mathworld*--A Wolfram Web Resource. http://mathworld.wolfram.com/LaplaceTransform.html). Applicant cannot overstate the prevalence of the use of transfer functions expressed as a function of "s" which is a Laplace domain variable ($s = jw$).

Roots of the polynomial equations in "s" are referred to as "poles" or "zeroes" depending upon whether the aforementioned root is a root of an s-polynomial in the numerator or denominator of the relevant transfer function.

With respect to a definition of HYB0 and HYBP, applicant submits that such terms are introduced into claims 7-9 as variables and that the claim terminology is identical to that introduced in the specification. In particular, HYB0 is described as the hybrid zero when describing the transfer function between the hybrid receive and hybrid output at page 15, lines 8-17 of the specification. Similarly, HYBP is described as the "hybrid pole" when describing the transfer function between the driver output to the hybrid output at page 15, line 21 through page 16, line 3. The claims at issue incorporate the same variable names and the same mathematical expressions set forth at pages 15-16 of the specification.

Applicant is free to choose any symbol desired for the variable names. Rather than choosing abstract variable names, the applicant has even selected variable names that are at least suggestive of what the variable relates to (HYB = Hybrid, 0 = Zero, P = Pole). The variables are introduced in the specification and a detailed mathematical analysis is provided at pages 15-16 (background pages 13-14).

Applicant respectfully submits that in view of the detailed description provided in the specification and the well-known practice of using Laplace domain variable "s" when describing transfer functions, this objection has been overcome.

RESPONSE TO 35 U.S.C. § 102 REJECTIONS

A. Statement of Law

Claims 1-3 and 5 were rejected under 35 U.S.C. § 102 as being anticipated by Gambuzza. Claims 6, 10 were rejected under 35 U.S.C. § 102 as being anticipated by Hjartarson.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

B. Response to 35 U.S.C. § 102 rejections of claims 1-3, 5

Applicant submits that claims 1-3 and 5 are not anticipated by Gambuzza. *Applicant maintains that Gambuzza does not teach or suggest a hybrid network having a hybrid input path capacitively coupled to the driver.* However, applicant has amended claim 1 to ensure that even if one accepted the Examiner's interpretation *arguendo*, ***Gambuzza does not teach a hybrid input path capacitively coupled to the driver and a hybrid receive path capacitively coupled to the subscriber line wherein the capacitive couplings are distinct.***

Gambuzza includes a disclosure of a hybrid network 330, and a driver (differential line transmit driver 340) coupled to a subscriber line 312. One input (differential) of the hybrid is coupled to the subscriber line 312. Another input (differential) of the hybrid is coupled to the output of driver 340. (Gambuzza, col. 5, lines 37-41, col. 7, lines 25-40; Figs. 3-4)

The Examiner stated in part:

> Gambuzza teaches the claimed subject matter as followed [sic]. "a hybrid network having a hybrid input, a receive input, and a hybrid

output, wherein the receive input is capacitively coupled to a subscriber line carrying upstream and downstream data signal" (Figure 4, elements 440A and 440B), wherein the paths through R7 and R8 teach "a hybrid input"; the paths through R5 and R6 teach "receive input"; and outputs from 440A and 440B teach "a hybrid output";

"a driver providing the upstream data signal to the subscriber line and the hybrid input, wherein the driver is capacitively coupled to the hybrid input, wherein the hybrid output provides the extracted downstream data signal from the subscriber line" (Figure 4, elements 430B, 430C).

(06/15/2004 Final Office Action, pgs 2-3)(*emphasis added*)

The Examiner has also stated that the features upon which applicant relies (i.e.,"the receive input includes both the signal transmitted by the driver and the signal received from the subscriber line"; "The hybrid input is associated with the transmitted signal and the receive input is associated with the signal appearing on the subscriber line") are not recited in the rejected claims. (06/15/2004 Final Office Action, p. 5).

Applicant traverses the Examiner's characterization of Gambuzza as well as the Examiner's statements in the Office Action.

A hybrid provides path separation (i.e., 2-4 wire conversion) for upstream and downstream signals being carried on the same communication line. The hybrid must extract the downstream signal from the composite signal carrying the upstream and downstream signals. Knowledge of the upstream signal enables extraction of the downstream signal from the communication line carrying both signals. Thus the hybrid will have an input for the upstream signal, an input for the composite signal, and an output for the extracted signal. Applicant has chosen to use the terms "receive path" (for the composite signal), "hybrid input" (for the upstream signal), and "hybrid output" (for the extracted downstream signal).

The Examiner has stated that claim 1 does not provide any association or differentiation between the "hybrid input", "receive input", and "hybrid output" as those in applicant's [prior] arguments. Contrary to the Examiner's remarks, applicant submits that these elements are clearly distinguished in claim 1 both prior to and subsequent the current amendment.

Claim 1 as amended includes the language:

> 1. An apparatus comprising:
> *a hybrid network having a hybrid input, a receive input, and a hybrid output, wherein the receive input is capacitively coupled to a subscriber line carrying an upstream data signal and a downstream data signal;*
> *a driver providing the upstream data signal to the subscriber line and the hybrid input, wherein the driver is capacitively coupled to the hybrid input, wherein the hybrid output provides the extracted downstream data signal from the subscriber line, wherein the capacitive coupling from the receive input to the subscriber line is distinct from the capacitive coupling from the hybrid input to the driver.*

(Claim 1, as amended)(*emphasis added*)

Thus the *receive input* is associated with the composite signal (upstream and downstream) appearing on the subscriber line. The *hybrid input* clearly is provided with the upstream signal by the driver. Finally, the *hybrid output* provides the extracted downstream signal.

Applicant agrees that Gambuzza discloses a hybrid having a hybrid input, a receive input, and a hybrid output analogous to the claimed receive input, hybrid input, and hybrid output, however, applicant respectfully submits that *Gambuzza's hybrid input is not capacitively coupled to the driver.*

The Examiner is free to analogize elements of Gambuzza to the extent such an analysis is consistent with applicant's claim language. Referring to Figure 4 of Gambuzza, the Examiner appears to be analogizing Gambuzza's receive path as the inputs to R5 and R6 rather than the inputs to R7 and R8. Applicant notes that this means that the inputs to R7 and R8 must be necessarily be the hybrid input.

Applicant will examine Gambuzza by 1) analogizing the inputs to R7, R8 as the hybrid input and the inputs to R5, R6 as the receive path; and
2) analogizing the inputs to R7, R8 as the receive path and the inputs to R5, R6 as the hybrid input.

1. Gambuzza's analogized receive input associated with R5, R6

If the Examiner analogizes the inputs feeding R5, R6 of Gambuzza's as applicant's claimed *receive input,* then the Examiner is forced to analogize the inputs feeding R7, R8 of Gambuzza as applicant's claimed *hybrid input.*

By the very nature of a hybrid, some component of the downstream signal will appear at the output of the driver. Applicant has attempted to clearly differentiate which input of the hybrid network is more clearly associated with the driver output and which input is more clearly associated with the subscriber line. Applicant submits that the Examiner has distorted the association by moving the receive input to the driver side rather than the line side of the RC-networks C5, R3 and C6, R4.

Although applicant believes that the claim language prior to this amendment was appropriate, applicant has amended the claim language to render the Examiner's analogy moot.

In particular, if the Examiner maintains that this analogy applies then the Examiner is relying on the same capacitive coupling (C5, C6) to provide both the capacitive coupling between the hybrid input and the driver as claimed AND the capacitive coupling between the subscriber line and the receive input as claimed. Applicant submits that this interpretation of *Gambuzza does not teach or disclose that the capacitive coupling from the receive input to the subscriber line is distinct from the capacitive coupling from the hybrid input to the driver.*

In contrast, amended claim 1 includes the language:

> 1. An apparatus comprising:
>
> a hybrid network having a hybrid input, a receive input, and a hybrid output, *wherein the receive input is capacitively coupled to a subscriber line carrying an upstream data signal and a downstream data signal;*
>
> a driver providing the upstream data signal to the subscriber line and the hybrid input, *wherein the driver is capacitively coupled to the hybrid input,* wherein the hybrid output provides the extracted downstream data signal from the subscriber line, *wherein the capacitive coupling from the receive input to the subscriber line is distinct from the capacitive coupling from the hybrid input to the driver.*

(Claim 1, as amended)(*emphasis added*)

Thus applicant respectfully submits that this interpretation of Gambuzza does not anticipate claims 1-3, 5 as amended.

2. *Gambuzza's receive input associated with R7, R8*

This analogy requires Gambuzza's receive input to be associated with R7, R8 and Gambuzza's hybrid input to be associated with R5, R6. Clearly under this interpretation, Gambuzza's hybrid input is not capacitively coupled to the driver 430. The receive path through R7 and R8 is capacitively coupled (through capacitors C8 and C7, respectively) to the subscriber line 412. *The hybrid input path through R5 and R6, however, is not capacitively coupled to driver* 430B or 430C.

In contrast, claim 1 includes the language:

> 1. An apparatus comprising:
> a hybrid network having a hybrid input, a receive input, and a hybrid output, wherein the receive input is capacitively coupled to a subscriber line carrying an upstream data signal and a downstream data signal;
> a driver providing the upstream data signal to the subscriber line and the hybrid input, *wherein the driver is capacitively coupled to the hybrid input*, wherein the hybrid output provides the extracted downstream data signal from the subscriber line, wherein the capacitive coupling from the receive input to the subscriber line is distinct from the capacitive coupling from the hybrid input to the driver.

(Claim 1, as amended)(*emphasis added*)

Thus applicant respectfully submits claim 1 is not anticipated by this interpretation of Gambuzza either.

Given that claims 2-5 depend from claim 1, applicant respectfully submits claims 2-5 are likewise not anticipated by Gambuzza. Thus applicant submits claims 1-3, 5 are not anticipated by Gambuzza under 35 U.S.C. § 102.

C. Response to 35 U.S.C. § 102 rejections of claims 6, 10

Claims 6, 10 were rejected as being anticipated by Hjartarson. Applicant submits that claims 6 and 10 are not anticipated by Hjartarson. In particular, Hjartarson does not teach or suggest a hybrid network, a hybrid input, a hybrid output, nor a hybrid of order less than two.

Hjartarson is drawn to methods of combining DSL and POTS (voice) signals on the same line card without the use of a splitter (see, e.g., col. 4, lines 1-10). The DSL 408 and POTS 406 circuits share a common driver 416 for driving signals onto the loop 404. Each of the DSL and POTS circuits receives the composite (i.e., upstream and downstream) signals from the loop (see

Hjartarson, Figs. 6-8). The network also includes an impedance synthesis portion to provide a complex impedance at low frequencies (i.e., for POTS) and a simple resistor as the termination impedance at high frequencies (i.e., for DSL). (Hjartarson, col. 4, lines 1-37).

Applicant submits that there is no teaching or suggestion of a hybrid or performing the function of a hybrid. In particular, the signal received from the loop and provided to each of the POTS and DSL circuitry includes both the signal (upstream) being driven by that circuitry onto the subscriber loop as well as the downstream signal to be received by that circuitry. Hybrid functionality must still be performed within the POTS or DSL circuitry.

1. Hjartarson does not teach or suggest a hybrid network

With respect to the rejection of claims 6 and 10 as being anticipated by Hjartarson, the Examiner has indicated that Figures 6-7 (all elements except element 407) illustrate a hybrid network of order less than or equal to 2. The Examiner has also cited col. 7, lines 25-28 in support of his argument. (06/14/2005 Final Office Action, p. 3)

Applicant respectfully traverses the Examiner's characterization of Hjartarson. The network identified by the Examiner is *not* a hybrid network. Hjartarson is drawn to methods of combining DSL and POTS (voice) signals on the same line card without the use of a splitter (see, e.g., Hjartarson, col. 4, lines 1-10). The DSL and POTS circuits share a common driver for driving signals onto the loop. Each of the POTS and DSL circuits receives a composite signal containing both the upstream and downstream signals from the subscriber line. The network also includes an impedance synthesis portion to provide complex impedances at low frequencies (i.e., for POTS) and a simple resistor as the termination impedance at high frequencies (i.e., for DSL). (Hjartarson, col. 4, lines 1-37).

The receiver circuitry disclosed by Hjartson does not extract the downstream signal from the composite signal appearing on the subscriber line. *There is no teaching or suggestion of a hybrid or performing the function of a hybrid. In particular, no downstream data signal has been extracted from the composite signal.*

Thus Hjartarson does not teach or suggest a hybrid network having .... wherein the hybrid output provides the extracted downstream data signal from the subscriber line.

In contrast, claim 6 includes the language:

> 6. An apparatus, comprising:
> a hybrid network having a receive port capacitively coupled to receive a composite signal including an upstream data signal and a downstream data signal communicated on a subscriber line, the hybrid network having a hybrid input port capacitively coupled to receive the upstream data signal from a driver, *the hybrid network providing the downstream data signal at an output port,* wherein the capacitive coupling from the receive port to the subscriber line is distinct from the capacitive coupling from the hybrid input port to the driver, wherein the hybrid network order is less than or equal to 2.

(Claim 6, as amended)(*emphasis added*)

With respect to the order of the hybrid network, the language cited by the Examiner states:

> Since both the POTS linecard 406 and the xDSL modem 408 circuits have high-order filters as part of their input circuits, the anti-aliasing filters can be simple first order filters.

(Hjartarson, col. 7, lines 25-28)

The Examiner is apparently attempting to analogize the disclosed anti-aliasing filters to applicant's hybrid. The anti-aliasing filter is used in the embodiment that illustrates generation of a frequency dependent impedance using digital means (Figure 7) as contrasted to analog means (Figure 6) (see, e.g., col. 6, lines 33-59). The anti-aliasing filter does not provide a hybrid function. Buffers 407 *clearly* provide the same composite signal to each of POTS 406 and DSL 408. No extraction or separation of upstream and downstream signals has been performed by the anti-aliasing filter or the remainder of the circuitry illustrated in Figures 6-7. At best separate paths are provided for the DSL composite (upstream and downstream signals) and the POTS composite signals. Each of POTS 406 and DSL 408, however, *still must perform the hybrid function* in order to extract the downstream signal (i.e., the signal it is supposed to receive) from the composite signal.

The DSL modem 408, for example, must extract the downstream DSL signal from the signal provided by buffer 407 that includes both the transmitted (i.e., upstream) and received (downstream) DSL signal from loop 404. Similarly, POTS codec 406 must extract the downstream POTS signal from the signal provided by buffer 407 that includes both the upstream and downstream POTS signal. The hybrid portions of the DSL 408 and POTS 406 circuits are not illustrated.

Applicant respectfully submits that Hjartarson *does not teach or suggest a) a hybrid network having a receive port capacitively coupled to receive the composite signal including an upstream and a downstream data signal communicated on the subscriber line; nor b) capacitive coupling of the hybrid input port to receive the upstream data signal from the driver.*

In contrast, amended claim 6 includes the language:

> 6. An apparatus, comprising:
> *a hybrid network having a receive port capacitively coupled to receive a composite signal including an upstream data signal and a downstream data signal communicated on a subscriber line, the hybrid network having a hybrid input port capacitively coupled to receive the upstream data signal from a driver,* the hybrid network providing the downstream data signal at an output port, wherein the hybrid network order is less than or equal to 2.

(Claim 6, as amended)(*emphasis added*)

With respect to the order of the hybrid, applicant maintains that Hjartarson does not teach or disclose a hybrid and thus cannot teach or disclose a hybrid network of order less than two. Even if we assumed *arguendo* that Hjartarson taught a hybrid, the Examiner must analyze the hybrid transfer function to determine the order of the hybrid network. *The order of an individual filter within a hybrid network is not dispositive of the order of the hybrid network itself.* Applicant respectfully submits that Hjartarson *does not teach or suggest a hybrid network having order less than or equal to 2.*

In contrast, amended claim 6 includes the language:

> 6. An apparatus, comprising:
> *a hybrid network* having a receive port capacitively coupled to receive a composite signal including an upstream data signal and a downstream data signal communicated on a subscriber line, the hybrid network having a hybrid input port capacitively coupled to receive the

upstream data signal from a driver, the hybrid network providing the downstream data signal at an output port, *wherein the hybrid network order is less than or equal to 2.*

(Claim 6, as amended)(*emphasis added*)

Thus applicant respectfully submits claim 6 is not anticipated by Hjartarson.

Given that claims 7-13 depend from claim 6, applicant respectfully submits claims 7-13 are likewise not anticipated by Hjartarson.

Applicant respectfully submits the rejections of claims 6, 10 under 35 U.S.C. § 102 have been overcome.

RESPONSE TO 35 U.S.C. § 103 REJECTIONS

Claim 4 was rejected as being unpatentable over Gambuzza. Claims 11-13 were rejected as being unpatentable over Gambuzza and Hjartarson. Applicant respectfully submits that claims 1-13 are patentable over the cited references. Applicant notes that none of the obviousness rejections were directed toward independent claims.

Applicant has argued that claim 1 is patentable over Gambuzza as discussed above and claims 2-5 depend from claim 1. Applicant respectfully submits claims 2-5 (including claim 4) are likewise patentable over Gambuzza.

With respect to claims 11-13, applicant respectfully submits *none of Gambuzza or Hjartarson teaches or suggests a receive port capacitively coupled to receive a composite signal...communicated on a subscriber line and capacitive coupling of the hybrid input port to a driver for receiving the upstream data signal, wherein the capacitive couplings are distinct.*

In contrast, claim 6 as amended includes the language:

6. An apparatus, comprising:

a hybrid network having a receive port capacitively coupled to receive a composite signal including an upstream data signal and a downstream data signal communicated on a subscriber line, *the hybrid network having a hybrid input port capacitively coupled to receive the upstream data signal from a driver,* the hybrid network providing the downstream data signal at an output port, wherein the hybrid network order is less than or equal to 2.

(Claim 6, as amended)(*emphasis added*)

Thus applicant respectfully submits claim 6 is patentable in view of the cited references. Given that claims 7-13 depend from claim 6, applicant respectfully submits claims 7-13 are likewise patentable over the cited references.

Applicant submits the rejections under 35 U.S.C. § 103 have been overcome.

CONCLUSION

Applicant respectfully submits that the stated rejections and objections have been overcome. Applicant respectfully requests allowance of claims 1-13 as amended.

If there are any issues that can be resolved by telephone conference, the undersigned representative of the applicant may be contacted at **(512) 306-9470 or (512) 858-9910.**

Respectfully submitted,

Date: March 8, 2005

William D. Davis
Reg. No. 38,428